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THE BOTANICAL WORK OF EDWARD LEE GREENE*

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Edward Lee Greene was born in Hopkinton, Rhode Island, August 20, 1843. His appreciation of the beauty of plants showed itself at a very early age, and was wisely fostered by his mother. At the meeting of this Society which was devoted to the celebration of his seventieth birthday he told us that his earliest vague childhood memories were of the geraniums in his mother's window. By the time he was eight years old he had a neighborhood reputation for his knowledge of the wild flowers.

His first serious botanical work was done after his family moved west. It was probably in 1859 that he came under the influence of an inspiring friend and teacher, who encouraged him to make botany his life work. Dr. Greene has written of this friend: "A purer, nobler type of the naturalist of the reserved and quiet, non-advertising class, there probably was not, in his day, than Thure Ludwig Theodore Kumlien. . . . It was evident, not only from the friendly correspondence which was

*A paper prepared for presentation before the Botanical Society of Washington, of which Society Dr. Greene was in a sense the first President. The present Society was formed in 1901, by the union of the Botanical Seminar, an informal organization without officers, dating from 1893, and the Washington Botanical Club, of which Dr. Greene was the President from the time of its founding in 1898 until the reorganization took place.

For material the writer is under obligations to friends and relatives of Dr. Greene whose contributions will be explicitly acknowledged in a more extended biography which is in preparation. More than to any others, however, the writer is indebted to President John Cavanaugh, C.S.C. and Dr. J. A. Nieuwland, of the University of Notre Dame. The plate for the picture of Dr. Greene appearing with this article has been loaned by the University of Notre Dame through the kindness of Dr. Nieuwland.

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always kept up between them, but also from many a pleasing anecdote which we were wont to hear of life and study and travel in intimate companionship with his revered master, that Mr. Kumlien had been, while at Upsala, a very special favorite among the botanical pupils of Professor Elias Fries. How thoroughly worthy the youth must have been, of the particular attention of the great Swedish botanist of the nineteenth century, was still manifest in Mr. Kumlien when I first made his acquaintance, some sixteen or eighteen years after his arrival in this country. He was then a sort of second and American edition of Fries, in his almost equal familiarity with each of the following great departments of botanical study; phanerogams, ferns and their allies, mosses, lichens and fungi. He had, in 1860, and I know not how long before, so well mastered the extensive and varied flora of southern Wisconsin, that there was no indigenous tree or shrub, flower, grass or sedge, or moss or hepatic, lichen or mushroom, the scientific name of which was not at his tongue's end for you at any moment. I am confident that, notwithstanding our considerable list of worthy names in American botany, no state in our Union has ever had so complete a master of its whole flora, as Wisconsin had in this extraordinary man, whom our eastern botanists seldom heard anything of; whom, with his low stature, muscular frame, rather stooping shoulders, light hair and keen blue eyes, a stranger might have mistaken, as he passed along the country roads, for an ordinary farmer from the Scandinavian settlement; who in the most polished society would have been recognized as an intelligent, refined and almost courtly gentleman; in whom any scholar would have found a finished collegian of the old Swedish school whose pen could indite Ciceronian Latin and whose tongue could address a foreigner in, I believe, any one of the languages of Europe spoken between Spain and Sweden."

Such was the man who passed on to Greene the best traditions of European botany. It may safely be said that his influence and teaching were of much greater value to Greene than the more formal education which he received at Albion Academy, an institution of collegiate standing from which he graduated in 1866, with the degree of Ph.B.

During the Civil War Greene served in the Union army as a private. It is related that he carried in his knapsack a copy of Wood's Classbook of Botany, and that whenever the exigencies of campaigning permitted, he was busy collecting and determining plants. Mr. Tidestrom has told us that the young soldier of nineteen made a collection of plants on the battlefield of Fort Donelson, which was mounted in an album by his mother and exhibited at a fair of the Sanitary Commission in Chicago. It was sold for \$50 and the proceeds used for the relief of sick and wounded soldiers.

After the war his botanical studies were continued earnestly and he entered into correspondence with several prominent botanists. I shall quote from his own manuscript, written, apparently, about 1890.

"My earliest botanical correspondence was with Professor Alphonso Wood and Doctors Asa Gray, George Engelmann and John Torrey. Between the years 1863 and 1867 I addressed several notes of inquiry about plants to Professor Wood, receiving courteous and helpful replies; but these are long since lost. The same fate has befallen two or three kindly communications from Asa Gray with which I was favored in 1869, while studying somewhat carefully and critically the flora of central Illinois. One of these was an unexpected note, along with which there was returned to me, through his hands, a piece of manuscript which I had sent to the American Naturalist for publication. The latter was to inform me that the article, on a proposed new *Tradescantia*, had been submitted to him for approval, and that he disapproved its publication; that in Kunth's Enumeratio more species of *Tradescantia* were credited to the United States than he himself was able to distinguish.

"To this communication I made a brief response, giving further reasons for holding my plant thoroughly distinct from *Tradescantia virginica*, with which he had always confused it. To this he gave a brief answer, advising me, as I well remember, though the letter is lost, to communicate with Doctor Engelmann on the subject of my proposed new *Tradescantia*, adding that this botanist was more skillful than himself in detecting specific characters.

“Being already in correspondence with Doctor Engelmann regarding certain oaks of middle Illinois, I made mention of the *Tradescantia*, receiving the following in reply; and it is the earliest of his letters to me which is still preserved.

“ ‘ST. LOUIS, Jan. 26, 1870.

“ ‘*Dear Sir*:—

I have for many years taken an especial interest in Oaks, and wish to obtain specimens of your *Quercus Leana*, but if possible with the fruit on the branch. I collect oaks a little before the fruit is ripe, say in September, and run a pin through the cup so as to attach the base of the acorn firmly. If possible, the specimens ought to show also the young fruit of the same season and the old maturing one of the last (eighteen months old). And when the tree is easily reached the flowers ought to be gathered (about the first week in May).

“ ‘The tall *Tradescantia* is the only one I have ever seen in cultivation in Europe, where it is the common one, always under Linné’s name, *T. virginica*. I can, as you do, always distinguish the low one, but not by any character of flower or fruit. I find that many years ago I even examined the parts microscopically and found the epidermal cells different. I also cultivated them. One might try and hybridize them, if flowering at the same period. As the modern views make species a less definite entity the importance of what is a species and what are varieties lessens wonderfully.

“ ‘I hope you will have a pleasant and successful trip.

“ ‘Yours truly,

“ ‘G. ENGELMANN’

“The concluding sentence of Doctor Engelmann’s letter relates to a purpose which I had formed, and which I had mentioned both to him and to Dr. Gray, of spending the season of 1870 in the Rocky Mountains of Colorado. My interest in the vast and then very little known flora of the far-western Territories had been awakened during my early school days, chiefly by occasional readings of the botanical parts of various Pacific Railway Survey Reports. My earliest teacher and companion in botanical studies, Professor Thure Kumlien (I have given a

sketch of the life of this early botanical friend and helper in *Pittonia*), had been in possession of these, and we had often looked over them together, admiring the wealth of those new regions in species and genera to us unknown; he regretting the improbability of his ever travelling so far from his Wisconsin home, but more than once fondly prophesying that his boy friend would go there, and would do much for the development of the botany of those new lands.

"In writing to Dr. Gray, late in 1869, I had expressed my purpose of going, and had asked him what books and papers bearing in Colorado botany were available; and his response, though brief, was most generous. It reads as follows:

" 'BOTANIC GARDEN, CAMBRIDGE, MASS.

" '12 Jan. 1870.

" 'MR. GREENE.

" 'Dear Sir:

" 'Dr. Torrey having come on to visit me, I have hardly had time to attend to anything but him. But I have now put up a parcel containing the Flora of North America and a few smaller things, and it will go to your address tomorrow. Well, in Colorado please send me what you can—notes and collections.

" 'Very truly yours,

" 'A. GRAY'

"The copy of Torrey and Gray's Flora which was thus furnished me by the kindness of its chief author is still in my possession, and is held as one of the best treasures of my library. It has been my companion upon many a thousand miles of western travel, and my surest guide in the study of the plants of Colorado, Wyoming and New Mexico, of Arizona and California, of Oregon and of Washington, Idaho, Montana and Nevada. I have given expression to my appreciation of it somewhat at length, in the first volume of *Pittonia*.

"The 'smaller things' referred to in the above letter were selections from his earlier Contributions, as they were called, published in the *Proceedings of the American Academy of Arts and Sciences*. The paper on New Plants of California and

Nevada, collected by Brewer, and also the monograph of *Astragalus* and *Oxytropis*, were among them, and were documents of great usefulness to one entering upon the study of Colorado botany thirty years ago.

“My departure from Decatur, Illinois, for Colorado Territory, was taken in early April, 1870. By the then new transcontinental railway I was conveyed, by way of Cheyenne, within three days, to Evans, Colorado. The last day’s travel was through a snow-storm which concealed the landscape, so that I was at the base of the Rocky Mountains without having seen them. The snowing ceased after night-fall, the sky clearing beautifully before morning, so that on going forth from my hotel lodgings at Evans just after sunrise, I had there my first view of the long dreamed of land of botanical promise. The prospect of early vernal botanizing was less inviting than it might have been; yet the landscape was beautiful beyond description; for not only Long’s Peak, so grandly conspicuous from Evans, but also the whole hundred miles’ length of outlying foothills, all lay in the dazzling sun-lit whiteness of fresh-fallen snow.

“But how transitory April snows may be in these fair fields I learned before noon of that warm sunny day. The day was chiefly occupied in the passage by stage coach to Denver, fifty miles distant; and before the middle of the afternoon all the snow was gone from the plains and lower foothills.

“On the bright spring morning following the arrival at Denver, I attempted what I supposed would be a mere early morning walk to the nearest foothills. I was naturally eager to see what floral indications of spring the plains and hills had to show. This desire was happily satisfied, and at the same time I learned, incidentally, how deceptive distance is in these regions, when, owing to the elevation and absence of humidity, the air is so thin and transparent. The little line of rounded grassy hills which I had judged to be three or four miles away seemed almost as distant as before when I had been walking directly towards them for an hour. And the long day was consumed in reaching what I had believed would be the easy goal of a not very long morning walk.

“Only a few flowers were observed. It was too early to expect them; but those hardy Umbelliferae, *Cymopteris* and *Peucedanum*, with their leaves and peduncles appressed to the ground, were showing their flowers, and the charming *Townsendia sericea* showed its cushioned tufts, of small narrow leaves, densely covered with its large white daisy-like stalkless heads. These and several more, all so strangely new to me that I did not even know their genus names, made the whole long day of walking a delight.

“Denver in 1870 was but a small country town of perhaps seven thousand inhabitants. The second day’s excursion brought me early into the valley of Clear Creek, to a prosperous farming settlement, and at one of the more commodious of the farm houses, that of Mr. Joseph Dudley, a farmer from Maine, I was soon established for the season. The time until late in June was given to the immediate valley of Clear Creek, the plains between them and Denver, and the foothills about Golden City. In July and August I made several excursions to the alpine regions of the more distant mountains; and the autumn months were given to the study of the numerous asteraceous plants of the plains and foothills, many of which were of genera wholly unknown to me.

“The cactus flora of the region was also something new to me, and attracted much attention, besides bringing me into further correspondence with Dr. George Engelmann, at that time the only botanist of the United States who had ever undertaken the study of them, with the exception of Nuttall and Rafinesque, men of an earlier generation, who had done their work and passed from the scene before ever the real cactus region had been opened to exploration.

“In response to some questions as to the best method of preserving for study the flowers of cactaceous plants, I received from Dr. Engelmann the following.

“ ‘St. LOUIS, April 15, 1870.

“ ‘E. L. GREENE, ESQ.

“ ‘Dear Sir:—

“ ‘So you are in the mountains! Good!

“ ‘The preservation of cactus flowers is not easy, as they are of a soft juicy tissue and are generally pressed so much that the parts are mashed, glued together and spoiled for further examination. The best method is to press the flowers; but for further examination a withered flower is better than a pressed one, as I see every day, now that I am examining Cactaceae from Nevada, Sonora and Lower California. The withered flowers can be soaked and the parts expanded, which is not possible with hard-pressed ones.

“ ‘To make as complete a specimen as possible, it would be well to slice the top of the plant (say a *Mamillaria*) off, then to get a lateral slice including the youngest areolae or spines, then horizontal sections through the middle, flowers and fruit not to be detached; then press flowers alone in cotton, if possible, and gather fruit; and at last get a flowering specimen and take it along, fresh or drying or dried, just as it chances.

“ ‘Collectors that were not botanists have sometimes done better than botanists because they just wrapped the plants up and packed them away. I am now soaking and developing such, and in several instances have been agreeably surprised by finding that in such condition the flowers had matured their seeds sufficiently at least for the botanist, if not for the horticulturist.

“ ‘Flat-jointed *Opuntiae* may be sliced, as you suggest. Don't forget the seeds, or rather, the fruits! We want good fruit (to propagate) even of the common *Mamillaria vivipara*, which you will meet abundantly, with its beautiful rose-colored large flowers. But *Echinocactus Simpsonii* is the great desideratum, living or in seed. I believe I have described it to you before. It is much like *M. vivipara* in appearance, but the flowers come out from the top (not from the base) of the tubercles next to the bunch of spines. I have just now before me a very fine form of the same plant from Nevada; but the species, which represents a very curious section of *Echinocactus*, is not yet in cultivation.

“ ‘I am much interested in *Coniferae*, but believe I know all about these plants in Colorado.

“ ‘Write to me, if you think my advice can be of any assistance to you.

“ ‘Yours truly,

“ ‘G. ENGELMANN.

“ ‘P. S. Other plants that interest me considerably are the yuccas. Specimens, notes, ripe fruit and seeds are valuable.’

“The early spring botanizing about Denver, and among the nearer foothills, yielded quite a number of carices, almost all of which were new to me; and Mr. Stephen T. Olney, of Providence, Rhode Island, being at that time the principal American student of these plants, I addressed to him a request that he examine my specimens of this genus, and report to me their names. It was the beginning of a pleasant correspondence. Here is his first letter.

“ ‘17 BROWN ST.

“ ‘PROVIDENCE.

“ ‘June 11th, 1870.

“ ‘EDWARD L. GREENE, ESQ.

“ ‘DENVER, COLO.

“ ‘*My Dear Sir:*

“ ‘In reply to yours of 4th inst. I will not only do what you ask in regard to *Carex*, but shall consider it a great favour into the bargain, as the sight of all collections in this interesting genus is of great advantage to me in the work I am upon, a monograph of North American *Carex*.

“ ‘Dr. Parry and Hall & Harbour got many interesting species in Colorado Territory. Then I have as well Fendler’s New Mexican, Sereno Watson’s Utah & Nevada, Bolander’s &c. Californian Survey, submitted to me for naming. I have also seen a portion of Hayden’s collection in Nebraska, many imperfectly named by good old Dr. Dewey. The Douglas, Drummond and other Rocky Mt. Carices I have seen in Torrey’s &c. herbaria.

“ ‘I should not feel it right to trespass upon your kindness in offering to send me from other genera, but should feel it a favour if you could supply me any plants not in Hall & Harbour or Vasey’s collections, at usual “rate of compensation,” or perhaps

I might take a complete set if informed of its character and how large it might be.

“ ‘My herbarium is going to Brown University, at least if they have the enterprise soon to provide safe quarters for it.

“ ‘Are you the son of a townsman of mine? If so, I extend to you the greetings of a Rhode Islander and

“ ‘Am truly yours,

“ ‘STEPHEN T. OLNEY.

“ ‘A *Carex* should be collected when its fruit is just so ripe and plump that it will not fall off, and root-stocks are always desirable. No more pressure should be put on them than is needed to keep the leaves flat, not so much as to crush the angles of the culms. Spikes with very ripe fruit in paper bags, if procurable at all, are very desirable, not pressed at all; but these refinements in collecting will hardly do when interruptions may occasionally occur, when one’s scalp may be in danger.’ ”

That the conclusion of Olney’s postscript was by no means altogether fanciful is brought home to us by an anecdote which Dr. Greene told at the memorable seventieth birthday meeting held in his honor by this Society. In 1870 he was collecting in an unsettled region to the west of Denver. His botanizing had led him about a quarter of a mile into an attractive valley, when he looked up and caught sight of an Indian on horseback. It was useless to attempt to retreat, so he continued his work as though quite oblivious of any danger. Indians seemed to appear from nowhere, until he thought there must have been 150 in the valley. Their chief demanded the bag which Greene carried. When he found nothing in it but plants he handed it back with the exclamation “Ugh! Medicine Man.” He asked Dr. Greene’s name, and in return said that he was Colorao. This notorious chief of the Utes was much feared by the settlers, and less than three years after this meeting with Greene he murdered an entire agency.

With the letter from Olney, the autobiographical fragment which we have been following practically ends. Greene appears to have written it originally in 1884, and to have copied and recast it six years later. The few pages of the earlier manuscript

which remain include letters from Dr. Gray (referred to by Greene as his "earliest happy correspondence with this most eminent of American botanists"), together with a list of the plants collected during the first season in Colorado, as determined by Gray and annotated, after the lapse of twenty-five years, by Greene himself. One of the letters is too interesting to omit. Greene writes: "The next letter came toward the close of my first season's work upon the botany of Colorado, and, as will be seen, relates mainly to the method of laying before him the results of the summer's collecting."

"BOTANIC GARDEN, CAMBRIDGE, MASS.
"Aug. 6, 1870.

"*Dear Mr. Greene:*—

Yours of July 27 is just in. Well, I think you would do well to send me, at the end of the season, a full set of all the plants which you do not know as in my Manual. Number the specimens, and I will return names, in as far as I can name them off hand, without special looking up—which may have to be postponed—and also any that strike me as of special interest. Such, of course, I shall be tempted to examine at once.

"If you send nice, or even fair specimens—as I hope—some will go into my herbarium at once, and all the rest will, if I do not care to keep them, go to some foreign correspondent whom I need to oblige, and who will be glad to have them.

"I hope you may find some new things; but you will be sharp if you do.

"Excuse haste, and believe me to be

"Very truly yours,

"ASA GRAY."

In a general review of the development of Rocky Mountain botany which he wrote only a few years ago, Greene alluded to this letter of Gray's as indicating a curiously inadequate idea of the richness of the western flora. "In this year 1870," he wrote, "it was the opinion of the highest authority that by the copious gatherings of Parry, Hall and Harbour, the botanical field of the Rocky Mountains had been well nigh exhausted." How far from the truth this idea was, the later work of Greene himself

attested. Yet it must not be forgotten that the fundamental conceptions of the two men in regard to species were absolutely unlike. Gray was extremely conservative; Greene was from his youth an American Jordan. For fifteen years, however, he deferred to the views of the older botanist, at least as far as publication was concerned. During this period, he tells us, the numerous new species which he collected, "in as far as published at all, had been published in the main by Asa Gray; this also not so much by sending him new types as by indicating the characters of species long in his possession, but wrongly placed by him because of his failure to see the characters."

The restraint imposed upon the younger botanist during this time may not have been wholly unfortunate for the cause of science. If we call to mind the case of his *Tradescantia*, we recognize, on the one hand, Greene's keenness of perception and accuracy of observation in pointing out the distinctness of the plant which is now kept up in our books as *T. brevicaulis* Rafinesque. We must admit, on the other hand, that Gray was quite justified in calling to Greene's attention his lack of knowledge of the literature of the subject. Early repression of his desire to publish only intensified Greene's ambition to possess bibliographical knowledge and facilities which should be second to none. We all know how this ambition was realized, for it was he who really introduced into America ideals of sound scholarship in the historical phases of systematic botany. His erudition in everything that concerned the older botanists was profound. The value of his precept and example in this field it would be hard to overestimate.

Greene wrote in 1910: "I shall never be chargeable with having been premature in making my beginnings at authorship on Rocky Mountain botany. To the study of this flora and other more or less related floras, to the eastward, westward and southward of it, I had devoted sixteen years; and a very considerable part of the knowledge gained so laboriously and devotedly, I had given to another to publish as his own. I was already forty-two years old and more, when, in 1885, I published my own first paragraph of new Colorado botany."

But to resume the thread of our narrative; at the close of his first season's botanizing Greene tells us that he had become enrolled as a regular candidate for Holy Orders in the Episcopal Church. Consequently in early spring he entered the Bishop's Collegiate and Divinity School at Janis Hall, Golden City, Colorado, both as teacher of science and student of divinity. After he became a minister he asked for duty in out-of-the-way places, in order to prosecute the better his chosen avocation. As an itinerant clergyman he acquired such a knowledge of far western botany as no individual had ever before, or probably has ever since, acquired at first hand. Professor Aven Nelson, than whom no one is in better position to know, has said: "The intimate field knowledge of the earlier decades of his career forms the basis for the discriminating work that is now the marvel and the despair of those of us who have drunk less deeply at the Pierian spring."

During his journeyings as a missionary he travelled thousands of miles on foot through dangerous and difficult country, often carrying only his plant press and a few changes of socks. In order to minimize the danger of losing his money, he sent it ahead in post office orders. In 1877 he made a trip on foot from San Diego, California, to Santa Fé, New Mexico. At that time the journey was ordinarily made by stage coach, for there were as yet no railroads in southern California. He encountered Indians, who did not offer, however, to molest him, and made friends on the way with a notorious bandit, "a fair-spoken, likable man, with polished manners," who conversed freely of outlaws and recommended them to Dr. Greene as good fellows to be with. After he passed through Yuma, the local paper published this item:

"Last Saturday evening the Rev. Edward L. Greene reached Yuma on foot from San Diego. On Sunday morning he preached an excellent sermon to a fair congregation, and another in the evening to a large one. On Tuesday morning, refusing all offers of transportation or financial help, he continued his way eastward. This is solid pluck in big chunks. Boys, get acquainted with him. You will like him and will find that he is no chicken-eating bummer."

On one of his excursions he discovered a beautiful valley about forty miles from Silver City. His glowing account of it induced some of his friends to choose it as a camping place, and there they were all murdered by Indians. Obviously, Dr. Greene must have had his narrow escapes; sometimes, perhaps, when he was quite unaware of the risks he was running. There is doubtless much old correspondence extant from which more details of these years of wandering may be gleaned. (His friends are urged to communicate to the writer any material which could fittingly be used in a more extended biographical account which is in preparation.)

A new phase of Greene's career opened in 1885, when he gave up the ministry to become an instructor in botany at the University of California. He was now forty-two years of age. Five years previously he had published his first botanical article, but now, under more favorable conditions for literary work, his development as a botanical author was very rapid. He had laid well the foundations for productive scholarship, and before the end of five years his publications had made him a factor to be reckoned with in the botanical world. His six important papers entitled "Studies in the Botany of California and Parts Adjacent" were the first noteworthy contributions to western botany published in the west by a resident botanist. On account of them the early volumes of the Bulletin of the California Academy of Sciences are prized as records of lasting value. The final paper of this series appeared in 1887, and in the same year was begun the publication of "*Pittonia*, a series of papers relating to botany and botanists." This publication, like several others which followed it in the course of years, was privately printed. Greene never grudged money which went to pay the printer. If anyone bought his volumes, well and good. But if he did not sell them directly, there was another and even more pleasing way to realize upon his investment. Each year the foreign book dealers with whom he dealt would sell a considerable number of his volumes and give him credit, which he would use in the addition of treasures to his library.

Five volumes of *Pittonia* were published, two of them in

California, the last three in Washington. If Greene had remained in California, it is likely that the new serial *Erythea*, which he established at Berkeley, would have permanently superseded *Pittonia*, and that no more than the first two volumes of the latter would have appeared. Aside from these serials, the busy years at the University of California saw the publication of *Flora Franciscana*, which was never completed, and of the *Manual of the Botany of the Region of San Francisco Bay*. He also edited for publication Kellogg's illustrations of West American oaks, for which he wrote the accompanying text.

Prior to beginning his "Studies in the Botany of California," Greene had had twenty short articles in the *American Naturalist*, *Botanical Gazette*, and *Bulletin* of the Torrey Botanical Club. These were of course carefully scrutinized by Gray, who did not attempt to conceal his distrust of the work of the younger man. When the first installments of the "Studies" reached him he reviewed them as follows: "They show a quickness quite equal to the author's well known quickness and acuteness in observation. Besides the interesting new material here elaborated—much of it gathered in an enterprising expedition by boat to the islands of Lower California—there is a good deal of reconstruction of old species, a large number of new ones, and several new or restored genera of plants. Valuable as these contributions to our botany must be, we suppose that more time for elaboration, less confidence as to specific distinctions, and a more restrained judgment about genera might have made them better. Yet opinions will naturally differ in botany as well as upon other subjects."

Gray's reception of "*Pittonia*" was even more curt: "We may infer that *Pittonia* is in reference to the family name of Tournefort, and that the publication may have had for its model the *Adansonia* of Baillon; but the ideas of genera and species are on quite another model. Perhaps the plan may be that of the *Linnaea*; for, as in that occasional rather than serial publication, a portion of the pages is given to reviews of recent botanical literature. Good botanists have followed Decaisne in referring the Big-roots to *Echinocystis*; but we suppose that the

validity of the genus *Megarrhiza* may still be seriously defended. The various new species of *Trifolium*, *Zauschneria*, etc., and the recast of *Krynitzkia*, *Plagiobothrys*, etc., into new forms may be safely left to the final judgment of competent botanists. Professor Greene's judgment and ours are widely divergent."

Long after, when Greene was a professor at the Catholic University of America, he wrote: "It is now more than sixteen years since the first installment was issued of the 'Studies in the Botany of California and Parts Adjacent'; and a retrospect reveals it that these 'Studies' had somewhat more in them of far-reaching consequence than the author of them could have anticipated. This first issue appears to have been the only paper published in our country in the life-time of the then venerable author of the 'Contributions to Botany' which had the effect of awakening in his mind any serious apprehensions as to the future prevalence in American botany of his own rigidly conservative taxonomic principles. Away back, almost at the beginning of his career, he had been confronted with innovators, like Rafinesque and Buckley, and had promptly placed their various propositions under the ban of his disapproval, which ban has now been removed, so that these men now live again, in their works, which are found to contain much in the line of actual, and very valuable, contributions to plant taxonomy. So, also, the 'Studies,' while not proclaiming, formally, any new principles, though implying reformatory doctrines in almost every paragraph, were also promptly, but with a gentleness not always characteristic of that author, anathematized. Two years later, however, the ban was completely removed, when the author of the 'Contributions' adopted precisely the reformed *Escholtzia* and the reformed *Sidalcea* of the 'Studies' which he had condemned, and today it will nowhere be questioned that the taxonomic reform now prevailing everywhere amongst us had its initiative in the first number of the 'Studies in the Botany of California and Parts Adjacent.'"

Greene was one of the last of the old type of self-trained men to attain a high professional position in botany. He entered botany as Nuttall, Torrey and Gray had done before him, with-

out having had a conventional university training in his chosen field. Moreover, at the time he received his appointment at the University of California, he was already in the beginning of middle life, and a training similar to that of the younger men who were elsewhere founding departments of botany in our universities and colleges had not been available to him. Although he held advanced views in taxonomy, and was rapidly acquiring the profound knowledge of the history of botany for which he was famous in later years, he was not trained in the newer phases of the science which were just being introduced, as it were, from Germany.

As we should expect, therefore, the department of botany which he founded at Berkeley bore an old-fashioned stamp. As late as the academic year 1892-'93 the courses offered were the introductory course in "vegetable structure and morphology," in which he was associated with Marshall A. Howe, now of New York. Greene offered three other courses, entitled "Systematic and Economic Botany," "Advanced Systematic Botany," and "Medical Botany." His associate, Howe, gave "Cryptogamic Botany."

Greene ranked as instructor during only one academic year, 1885-'86. The following year he was made assistant professor. Five years later he became associate professor, and the year following he was advanced to a full professorship. In all, he served ten years at Berkeley, during which time he built up a strong department and was held in high esteem for his scholarly attainments. In the report of the president of the University for 1891-'93 we find: "In the department of botany much good work has been done with the students and still more in classification and correspondence. In 1892, at the World's Congress of Botanists held in Genoa, Professor Greene was named as a member of the International Committee on Botanical Nomenclature, one of three members from the United States. He was president of the Botanical Congress held in connection with our Columbian Exposition at Madison, Wisconsin."

In the university librarian's report for the same year we find a lament which cannot fail to bring a smile to those who know

how Dr. Greene loved books: "A new separate department of study like botany or pedagogy is established; and at once it claims its share of whatever money is available for the purchase of books (which income unfortunately does not increase) and the appropriations for older departments, like history, linguistics, or philosophy, are decreased. In this manner, all maintain a wretched existence on famine allowance."

Dr. Greene's propensity for buying books never grew less. Throughout his life he sacrificed even the comforts of living in order to buy books, to pay for the printing of his privately published volumes, and to travel in search of plants. Of his library and herbarium, more will be said later.

Professor Greene had leave of absence the first half of the year 1894-'95, and resigned at the end of the year to accept the professorship of botany in the Catholic University of America at Washington. He left his department in a flourishing condition. Howe and Jepson had taken over the course in structure and morphology; Jepson was associated with him in the courses in systematic and medical botany; Davy, now in South Africa, had taken over the economic botany; and Greene himself had added courses in the "History of Botany" and the "Phanerogamic Natural Orders."

Greene's impress upon the University of California remains to this day. Except at Harvard there is no university where the systematic tradition has been upheld as it has been at Berkeley. To be sure none of Dr. Greene's successors at the University of California are advocates of his methods and beliefs in taxonomy, but the fact remains that Greene was able to establish on the Pacific coast a center of systematic research of such vitality that it has held its own and prospered in competition with the same forces that have elsewhere brought about the decline of systematic botany.

During the ten years at Berkeley, teaching and literary work of course somewhat diminished the time available for collecting. Every vacation, however, was used for a trip to some previously unvisited part of the state. At the time of his removal to Washington, his herbarium had assumed enormous proportions

for a private collection, and its richness in type specimens made it one of the most valuable in America.

Dr. Greene had become a Roman Catholic prior to his departure from California. In 1894 the University of Notre Dame conferred upon him an honorary doctorate, and in 1895 he entered upon his new duties at the Catholic University in Washington. Here he found himself in an entirely new environment. In an institution largely devoted to theological instruction, there were few students in his department. Conditions on the whole were uninspiring and unfavorable to scientific work. He gave up his position in May, 1904, and from that time until a short time before his death he was connected with the United States National Herbarium and the Department of Agriculture.

During the period of his professorship at the Catholic University he continued his systematic and historical work with unremitting perseverance, and published, in addition to numerous miscellaneous papers, the last three volumes of *Pittonia*. He began at once a new serial, "*Leaflets of Botanical Observation and Criticism*," of which two volumes were printed. A few pages of the diary kept by him the summer after he left the Catholic University are preserved among his papers, and give a vivid picture of his activities at that time. The one or two amusing touches might perhaps be more discretely omitted, but to old friends and associates of Dr. Greene they are hardly calculated to give offense.

DIARY. AUGUST, 1904.

"August 1. Ascertained again original of *Eschscholtzia Douglasii*, and worked on the species, drawing up a new diagnosis, from Oregon and Washington specimens by Suksdorf and Cusick.

"From various notes made last week, began writing the Neckerian Genera of Cactaceae.

"At 3:30 p. m., found . . . struggling with an . . . from Georgia, of which a fine printed plate and mounted specimens were before him; a plant with articulated hollow petioles at base of stem, with no blade developed. He had been trying to make

it a *Carum*. My first glance suggested *Sium* and I said so. He pointed to the jointed petioles. I said: does not my *Sium heterophyllum* have below its leaf-blades jointed petioles? A search for my specimens showed such to be the case in that and some other species of *Sium*; and so I wonder what conclusion he will reach as to the genus.

"August 2. Letter to Parish with names of plants identified. Wrote on Necker's Cactaceae, but with little success.

"August 3. Look up Necker's Cact. again; went into a more general study of his system and terminology; rewrote one page of my paper. Gave time to . . . on the subject of type for Linnaean *Cactus*, a name that should not be maintained at all; showed him, out of the Philosophia Botanica that *Cactus* is, with him, merely abbreviated from *Melocactus*, which later is therefore the type of *Cactus* with Linnaeus; which is what . . . wants, and this revelation pleased him. He consulted me also about *Dalea* as a genus name, to be taken up as a synonym from Linn. Sp. Pl., instead of *Parosela* Cav. Of course, *Dalea* is the name for the genus by simple priority, irrespective of its suppression by Linnaeus, as I said; but I also assured him that *Dalea* should be taken up, if need be, as prior by its place in the synonymy of Linn. Sp. Pl.

"Received today a fine copy of Caesalpino from Junk of Berlin; also from Wesley and Son Lindern's two books on Alsatian botany. Ordered more books from Junk. So passed the day, with apparently little done, yet possibly not so little.

"August 4. Day of indisposition. Nothing accomplished but a little manual labor at books and specimens.

"August 5. Succeeded in making an end of the paper on Neckerian Cactaceae; which, when on account of Mr. . . .'s wish to learn what these genera really were he induced me to undertake, I thought I could do in two hours; but it is one thing to ascertain the identity of Necker's groups and quite another to make each case plain to the ordinary every-day botanist who can read or understand nothing without the aid of an actual interpreter. It is the effort to make clear to others of slow apprehension and small learning, what is plain at a glance, that takes up so much time.

“Had a very pleasant letter from Mr. Bicknell; and one demanding a prompt answer, and answered it.

“Responded to a query on the part of Mr. Maxon as to the value of such a character as that of perfectly articulated and therefore deciduous pinnae in the frond of a fern supposed, and commonly accepted, to be of the same genus in which the pinnae are never deciduous, nor furnished with a distinct articulation. My answer was, an opinion somewhat impromptu, that the two kinds of fronds ought not to be embraced within one genus, no matter how much alike in other particulars.

“August 6. Studied Cichoriaceae as to their history in taxonomy; especially as to the long admitted affinity for Campanulaceae, which idea I fail to trace to any earlier original than Jussieu. Such studies consume much time; and this whole day was divided between this work and some correspondence.

“August 8. Worked in the morning at study of the difficult problem of *Eschscholtzia Douglasii*; with conclusion that the Californian plants of that name in my Fl. Franciscana etc., are different from the Oregonian. Spent afternoon at University, searching for manuscript, book-packing, etc. Left some *Leaflets* copy with printer.

“August 9. Finished paper on New Apocynums for *Leaflets*, and made progress on the Affinities of the Cichoriaceae.

“August 10 and 11. Worked on title aforementioned.

“August 12. Worked on *Eschscholtzia*, defining *E. Douglasii* anew, and restricting it to the Oregonian plant. Had a pleasant visit from Mr. O. F. Cook, lately back from Guatemala. At University in the afternoon packing.

“August 13. Further work upon *Eschscholtzia*; establishing a little doubtfully the identity of my unpublished *E. cornuta* with *E. cucullata*.

“Determined Californian *Lupini* for C. F. Baker.

“August 17. Finished affinities of Cichoriaceae and took to printer.

“August 18. Received proofs.

“August 19. Read proofs of ‘*Leaflets*’ and returned them. Determined Calif. plants for C. F. Baker. Worked a little on

Hist. of Goldenrods, a study begun on the 17th, and a highly interesting study.

"August 20. All day engaged upon a study of Gentianaceous genus *Pneumonanthe* or *Dasystephana*; very interesting: hesitant as to which name to take up, that of *Renealm* or that of *Cordus*.

"August 22. Finished paper on *Pneumonanthe* or *Dasystephana*. Resumed a long-interrupted study of the fringed gentians. *Spiragyne* now seems to be the name, though it has for months perplexed me. The 'spirally revolute' stigmas hard to account for; but other authors define them as revolute.

"Visited by Knowlton, for help.

"August 23. Studied history of *oides* genus-names, in light of Linnaeus' article in *Philosophia Botanica* and made a good beginning on paper for 'Leaflets.'

"Visited by Tidestrom on account of *Peltandra* species.

"August 24. Indisposed.

"August 25. Indisposed.

"August 26. Worked at C. U. A. all day, moving books, etc.

"August 27. Resumed work on *oides* names, and began an article for 'Leaflets.'

"August 29. Wrote initial three pages of article for 'Leaflets,' the title 'A Neglected Code.'

"August 30. Rewrote two pages of 'Neglected Code.' Worked at packing at C. U. A. in the afternoon. Later studied Paris Code; on which I ought to write a commentary, and maybe shall. Visited by Knowlton in the morning, who wanted an answer for a man who wrote of a Texan shrub like a rosebush, but with parsley-like foliage and fruit with the flavor of grapes. He had applied all around. It was, of course, *Vitis bipinnata*."

When Dr. Greene entered the Smithsonian Institution in May, 1904, an honorary associate in botany, he arranged for the transfer of his library and herbarium from the Catholic University to the National Herbarium.

The terms under which the National Museum assumed the responsibility of housing and caring for the collections were advantageous both to Dr. Greene and the Museum. The collections were to be accessible for study by the museum staff and

other properly qualified persons, and were not to be removed before a period of ten years had elapsed. If, in the meantime, the death of the owner should occur, the collections were to pass into the possession of the museum, and the museum might, at any time within the period, secure absolute title to the library and herbarium upon payment of \$20,000.

The years in the Smithsonian Institution were fruitful ones. They witnessed the completion of the two volumes of "*Leaflets*" and the first volume of the "Landmarks of Botanical History." The latter work met with a very favorable reception. Dr. Greene received letters of commendation from botanists at home and abroad; among many others there were very pleasant letters from Saccardo and Thistleton-Dyer. He hoped to complete "Landmarks," and in 1914 even began, in cooperation with the writer, a new serial, *Cybele Columbiana*.

The arrangement with the National Museum terminated in May, 1914. Dr. Greene was no longer in robust health and no move had been made towards the acquisition of his collections by the museum.

In the fall of 1914, he therefore arranged for the transfer of all his books and specimens to the University of Notre Dame. According to the terms of the transfer the library and the herbarium were to be kept in perpetuity, separate and distinct from all other property of the university, and to neither were any additions ever to be made. "Neither undergraduate students nor any novices in botany" should have free access to this collection at any time. Under no circumstances were specimens from the herbarium to be sent out as a loan from Notre Dame, either to an institution or an individual.

Of course Dr. Greene himself was to be the curator of the collections, as long as his health and strength should permit. The consideration for which these priceless collections were to be given to Notre Dame was a modest annuity. The clause in the agreement concerning the annuity was most characteristic of Dr. Greene: "Such annuity to cease with my death, or, even within my lifetime, in case of my becoming, through age and infirmity, or mortal illness, hopeless of further usefulness, and a charge upon the community."

Dr. Greene removed to Notre Dame late in 1914. It was an occasion of deep regret to many of us. There was not only the personal loss to those of us who were his friends, but also the more general loss to science which was entailed in the removal of his collections from Washington.

During the ten years of his connection with the National Museum, the Library of the Department of Agriculture was being built up, so that there were really not a very large number of books in Dr. Greene's collection at the end of the option period that were not elsewhere available in Washington. It must always, however, be regarded as a great misfortune for the nation and a piece of great good fortune for the University of Notre Dame that the government did not take advantage of its option to secure the herbarium, which contains hundreds, if not thousands, of type specimens.

On the occasion of Dr. Greene's seventieth birthday the Botanical Society of Washington arranged to present him with a book-plate. He had long intended to have one, for his books were marked with an anything but artistic printed slip which had been pasted in them at the time his library was placed on deposit at the Smithsonian Institution. The plate was designed by Mr. Krieger, following Dr. Greene's own ideas. He was very much pleased when it was finally done and turned over to him and expressed his intention of acknowledging it at a meeting of the Society. He wrote out with some care the remarks which he intended to make but I find among his papers only a few preliminary jottings on rough scraps of paper:

"I take great pleasure in saying that in the interval which has passed since our last meeting and this one, I have received the book-plate for my library, which the Society had the kindness to accord me, on the occasion of its most cordial celebration of my septenary last year. I regard the gift as a most beautiful piece of art, and it is all the more prized as being an expression of the appreciation and good will on your part which I had no reason that I know of to look for, and which I wish I had better deserved at your hands. Of the library itself, however, few if any among you know all its merits. It is the pioneer among

all American collections of pre-Linnaean and rare post-Linnaean books. The absolute necessity of this kind of botanical literature to the interpretation of Linnaeus himself was well seen by me fifteen years before such a thought had entered the minds of the botanists of Boston, New York or Washington."

At the time it went to Notre Dame, the library consisted of some 4,000 "most choice volumes" and the herbarium of perhaps 100,000 mounted specimens, many of them priceless types.

In October, 1915, Dr. Greene returned to Washington from Notre Dame in the hope that he would be able to continue work on his "Landmarks." It was obvious to his friends that he was failing rapidly. He endeavored to work as long as he had even a little strength but permitted himself to be taken to Providence Hospital on the 25th of October. He died November 10, 1915, and was buried at Notre Dame.

He had given his life to the cause of science. Some there are who doubted the value of his work and questioned the motives which actuated his caustic criticisms. Of enemies he had many; of friends but a few. During a large part of his career the forces arrayed against him would have daunted a less courageous man. It is not to be wondered at that his tongue and pen were sharp, and that sometimes he gave expression to thoughts that might have been better left unsaid. It is certain that his enemies were for the most part those who did not know him personally; those who had met and talked with him bore no resentment for anything he may have said. And whatever may be said of his words, his deeds were always kind.

To you, his friends, it is not worth while for me to attempt to sum up his character, for he was a many-sided man, and none of us saw exactly the same side. He was even full of contradictions, if you will; "a man of many moods and fancies," one of his biographers has called him. Nor will it be worth while for any of us, for many years to come, to attempt an exact appraisal of his contributions to science. Certain it is, however, that few, if any, exerted a greater influence than he in the development of systematic botany in America.